UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/736,353	12/14/2000	William L. Betts	061607-1360	8924

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EXAMINER
MUNOZ, GUILLERMO

ART UNIT	PAPER NUMBER
2637	

DATE MAILED: 08/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *14 December 2000*.
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-48* is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) *1-33 and 35-48* is/are rejected.
7) ☒ Claim(s) *34* is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All   b) ☐ Some * c) ☐ None of:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. _____.
    3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
       application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date __2,3__
4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 24 and 25 are objected to because of the following informalities: Claims 24 and

25 appear to be dependent on claim 23. Appropriate correction is required.

Allowable Subject Matter

Claim 34 is objected to as being dependent upon a rejected base claim, but would be

allowable if rewritten in independent form including all of the limitations of the base claim and

any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 34 is considered allowable because the present invention comprises a transmitter

having a convolution encoder having a plurality of variable unit time delays. The variable unit

time delays are set to zero prior to the encoding of each data frame. The closes prior art ITU-T

G.992.1 "Asymmetrical Digital Subscriber Line (ADSL) transceivers teach a similar convolution

encoder, however, G.992.1 fail to teach setting the delay to zero prior to the start of each data

frame.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in

section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the

manner in which the invention was made.

Claims 1-8, 28, 35-39, 47, and 48 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Betts et al. (US Patent 4,677,625) in view of Laroia et al. in further view of

Alcatel "G.gen-bis-Robuster Tone Ordering And Flexible Pilot Allocation" and ITU-G.992.1.

Regarding claim 1; Betts et al. teach almost all the claimed subject matter "encoder

capable of...non-sequential order" as follows. Betts et al. teach a Trellis encoder, note elements

18, 20, 22, and 24 of figure 1, however, Betts et al. do not explicitly state the encoders are

capable of receiving a plurality of bits on tones. Additionally, Betts et al. teach a dual skipping

switch note elements 16 and 42 of figure 1, however, Betts do not explicitly state the dual

skipping switch is capable of passing a plurality of bits on tones in a non-sequential order.

Laroia et al. teach an OFDM based spread spectrum system which teach encoding done

optionally by a convolution encoder, note Col. 5, lines 1-15. Laroia et al. do not explicitly recite

"plurality of bits on tones", however, the subject matter is an inherent characteristic of OFDM

systems. Laroia et al. teach using slow hopping in the uplink channel to optimize spectral

efficiency, note Col. 2, lines 30-34; and suggest optimizing the hopping pattern and tone

assignment in Col. 2, lines 30-31, however, Laroia et al. do not explicitly state optimizing the

hopping pattern by processing the OFDM tones in a non-sequential order.

Alcatel teach the use of non-sequential frequency ordering of DMT carriers for reducing

radio frequency interference, note Abstract.

Therefore, it would have been obvious to one having ordinary skill in the art at the time

of the invention to modify Betts et al.'s encoders with Laroia et al.'s teaching of optionally using

convolution encoders capable of processing OFDM communications, since Laroia et al. suggest

Col. 1, lines 13-15 that the use of an OFDM system would increase spectral efficiency.

Furthermore, it would have been obvious to one having ordinary skill in the art at the time of the

invention to optimize Larioia et al.'s hopping pattern with Alcatel teaching of using non-

sequential carrier orders, since Alcatel suggest in the abstract that the optimizing of the hopping

pattern enhance DMT modulation.

Regarding claim 2; Larioia et al. do not explicitly teach "a mapper", however, the

claimed information is inherent to a wired OFDM communications system. For example, ITU-T

G.992.1 discloses a wired OFDM system using a coset mapper in figure 7.13.

Regarding claim 3; although Alcatel do not specifically disclose the non-sequential order

skips 3 tones. Alcatel teach flexible reordering is negotiated. The limitations in claim 3 do not

define a patentable distinct invention over that in Alcatel since both the invention as a whole and

Alcatel are directed to adjusting the order of the DMT carriers so as to adjust the hopping

pattern. The degree in which the hop is made presents no new or unexpected results, so long as

the carriers are non-sequential. Therefore, to have a skip of 3 tones would have been routine

experimentation and optimization in the absence of criticality.

Regarding claim 4, see claim 3.

Regarding claim 5, see claim 3.

Regarding claim 6; Alcatel further teach the claimed subject matter in the Abstract.

Regarding claim 7, see claim 3.

Regarding claim 8, Laroia et al. further teach the claimed subject matter, note Col. 4,

lines 30-45, wherein the OFDM symbols are equivalent to DMT symbols.

Regarding claim 28, as applied to claim 2 above, it would have been obvious to apply the output of Betts convolution encoders to the coset mapper in synchronization with the order in which they are applied to the convolution encoders.

Regarding claim 35, as applied to claim 1, Betts et al. do not explicitly teach the claimed subject matter "passing a plurality of bits...non-sequential order", however, it would have been obvious to one having ordinary skill in the art at the time of the invention that the receiver in Fig. 3 would need to operate complementary to the transmitter.

Regarding claim 36, Alcatel do not explicitly teach the claimed subject matter "non-sequential order is the same", however, it would have been obvious to one having ordinary skill in the art at the time of the invention that the receiver would need to operate complementary to the transmitter.

Regarding claim 37, see claim 2.

Regarding claim 38, see claim 5.

Regarding claim 39, see claim 8.

Regarding claim 47, see claim 28.

Regarding claim 48, see claim 28.

Claims 9, 10, 12-27, and 40-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betts et al. (US Patent 4,677,625) in view of Laroia et al. in further view of Alcatel "G.gen-bis-Robuster Tone Ordering And Flexible Pilot Allocation" and Voith et al..

Regarding claim 9; as applied to claim 1, Laroia et al. teach the convolution encoder

optionally used for wired communications using an OFDM modulation system, however, Laroia

et al. do not teach a constellation buffer for receiving the output of the convolution encoder.

Voith et al. teach a DMT transmission system having an output of the convolution

encoder input into a constellation buffer for the purpose of outputting data at a constant rate, note

Col. 6, lines 44-47.

Therefore, it would have been obvious to one having ordinary skill in the art at the time

of the invention to modify Laroia et al.'s transmitter with Voith et al.'s teaching of using a

constellation buffer for receiving the encoder output, since Voith et al. suggest in Col. 1, lines

24-30 and Col.2, lines 13-15 that the constellation buffer would help solve rate adjustment in an

ADSL transmitter.

Regarding claim 10; as applied to claim 9 above, Voith et al. do not explicitly state "bit

extractor", however, the functionality of the rate adaptation buffer (74 of Fig. 3) is the same.

Regarding claim 12; see claim 10.

Regarding claim 13, see claim 2.

Regarding claim 14, see claim 5.

Regarding claim 15, see claim 6.

Regarding claim 16, see claim 8.

Regarding claim 17, see claim 10.

Regarding claim 18, see claim 2.

Regarding claim 19, see claim 13.

Regarding claim 20, see claim 5.

Regarding claim 21, see claim 6.

Regarding claim 22, see claim 8.

Regarding claim 23; as applied to claim 12, Larioa et al. further teach the option of

implementing the system with hardware capable of executing software, note Col. 3, lines 58-67.

Regarding claim 24, see claim 13.

Regarding claim 25, see claim 14.

Regarding claim 26, see claim 15.

Regarding claim 27, see claim 16.

Regarding claim 40, see claim 10.

Regarding claim 41, see claim 10.

Regarding claim 42, see claim 17.

Regarding claim 43, see claim 18.

Regarding claim 44, see claim 20.

Regarding claim 45, see claim 36.

Regarding claim 46, see claim 8.

Claims 11, and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Betts et al. (US Patent 4,677,625) in view of Laroia et al., Alcatel "G.gen-bis-Robuster Tone

Ordering And Flexible Pilot Allocation", and Applicant Admitted Prior Art (AAPA).

Regarding claim 11; as applied to claim 1 above, Laroia et al. teach an OFDM based

spread spectrum system which teach encoding done optionally by a convolution encoder, note

Col. 5, lines 1-15, however, Laroia et al. do not teach the details of a convolution encoder.

AAPA disclose in a prior art convolution encoder is forced to a zero state with the last of the DMT symbols, note page 16, lines 14-18 of the instant application.

Regarding claim 29; as applied to claim 11 above, AAPA disclose programming variable interleaver depth from the ADSL receiver to an ADSL transmitter, note page 17, lines 10-13 of the instant application.

Regarding claim 30, see claim 29.

Regarding claim 31, see claim 11.

Claims 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of ITU-T G992.1.

Regarding claim 32; AAPA disclose programming variable interleaver depth from the ADSL receiver to a ADSL transmitter, note page 17, lines 10-13 of the instant application.

ITU-T teach a convolution encoder in figure 7.14 having and input being two bits and an output including a third bit. ITU-T teach the convolution encoder used for Reed-Solomon codeword Interleaving, wherein "the interleaving depth varies..byte B_i (with index i) is delayed by (D-1) x I bytes, where D is the interleave depth" (7.6.3).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify AAPA's ADSL transmitter with ITU-T's teaching of vary the time delay units depending on the interleaving depth programmed from the ADSL receiver since ITU-T suggest in paragraph 7.6.3 that the convolution delay is directly dependent on the interleaving depth.

Regarding claim 33, see claim 32.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Munoz whose telephone number is 703-305-4224. The examiner can normally be reached on Monday-Friday 8:30a.m-4:30p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 703-308-7728. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).
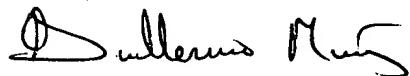
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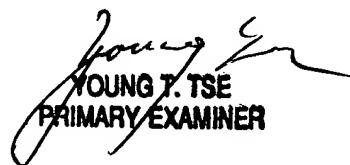
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